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XXI. *On the re-establishment of a canal in the place of a portion of the Urethra which had been destroyed.* By HENRY EARLE, Esq. Surgeon to the Foundling, and Assistant Surgeon to St. Bartholomew's Hospital. Communicated by Sir HUMPHRY DAVY, Bart. P. R. S.

Read April 12, 1821.

IF any apology be requisite for bringing forward the following insulated fact, I hope it will be found in its tendency to throw some light on an interesting physiological subject, which has lately occupied the attention of this learned Society, as well as in its novelty and general importance.

Of all the complaints to which the human body is liable, there is, perhaps, no class more productive of corporal and mental suffering, than the various affections of the male urethra. For it is most obvious, that any deviation from healthy structure in that part, which, from its peculiar function, is called into action after very short intervals of repose, must, from that circumstance alone, be productive of almost constant suffering; while the mind of the patient is also depressed from the effect of a continual anticipation of pain, and the apprehension of impaired virility.

The following is a statement of the result of a new operation in a very aggravated case, by which an individual has been raised from such a state of despondency to one of comparative happiness.

JOHN WHITAKER, whilst serving on board his Majesty's ship *Pylades*, off the island of Sardinia, in May 1813, when returning on board from Magdalina, fell with one leg on each side of the boat, the stem of which injured his urethra so much in the perineum, that he was obliged to have the catheter introduced for above six weeks. From that time he continued to experience more or less difficulty in discharging the contents of the bladder until the beginning of May, 1819, when he was attacked with a sudden retention of urine, which was soon followed by extensive effusion into the cellular substance. Before he could obtain surgical assistance mortification had taken place, and the integuments in the perineum, with above an inch of the canal of the urethra, had sloughed away. A free vent being thus obtained, the mischief did not extend itself to the scrotum. During the healing process, the medical gentleman who attended him, made several unsuccessful attempts to unite the integuments over a catheter.

He came under my care the following August, in Saint Bartholomew's Hospital; at which time a large smooth cicatrix occupied the place of the urethra, no vestige of which remained at that part. The mucous membrane of the canal was distinctly visible, terminating above, and recommencing below, the cicatrix. Through the posterior aperture the whole of the urinal and seminal discharges came away, while the anterior portion of the urethra, particularly that part which passed behind the scrotum, was increased in density and much contracted, and probably would ultimately have been completely obliterated by disuse.

The man was by trade a carpenter; and, as he was obliged to work, it was a very serious inconvenience to him every

time he obeyed the calls of nature. This, coupled with the distressing excoriation attendant on the scattering of the urine, made him anxious to submit to any plan of treatment which afforded a possibility of relief, and I determined on pursuing the following one.

The integuments on the right side had suffered less extensively than those on the left, so that when a catheter was introduced, that portion which passed across the cicatrix could be about half covered by drawing the skin and cicatrix from the right towards the opposite side. My first attempt, therefore, was to encourage this disposition in the integuments to fold over; and as some delay was requisite in order to dilate the anterior part of the urethra with bougies, he was directed to remain in bed with his knees tied together over a pillow, and a truss was so applied as constantly to press the integuments from the right to the left side.* To this plan the ultimate cure of the patient is in some measure referable.

After some weeks, the urethra being sufficiently dilated to admit a moderate sized catheter, I determined to attempt the following operation. The smooth cicatrized surface having become insensible to the irritation of the urine, I resolved to employ it in the formation of a canal, and to endeavour to connect by it the two portions of the urethra: for, as many

* I constructed a similar truss some years before, for the relief of a female suffering under incontinence of urine, and have since successfully employed it in three cases. It consisted in a spring which passed round the front of the body above the pubes, and fastened with a strap behind. From the centre of the truss a fine spring descended, taking the necessary curve to pass under the arch of the pubes, and terminating in an oval pad covered with oil silk, about an inch in length, and half an inch wide.

months had elapsed since the healing of the wound, all contraction in the cicatrix had ceased, and it was probable that a passage formed of such parts would not be liable to any farther diminution in its calibre.

On the other hand, I had to contend with two great difficulties : in the first place, the portion of cicatrized integument intended to be separated, was not of original formation ; consequently, it was endued with less vital energy, and possessed fewer blood vessels : secondly, it was not possible to allow the parts to be at rest for the completion of any curative process for many hours together ; the force also with which the urine was expelled, and the acrid nature of that discharge, were alike unfavourable to the cure by adhesive inflammation. All these circumstances having been well considered, a portion of integument was removed about an inch and half long, and one-third of an inch in width, on the left side of the cicatrix ; the groove thus formed being intended to receive the edge of skin to be detached from the opposite side. An incision was then made across the perineum above and below, so as to pare away the callous edges of the urethra. The cutis was next dissected off from a portion of integument on the right side of the perineum, about an inch and half in length and half an inch broad, leaving a smooth space of rather more than an inch between the cut surfaces, which was intended to form the lining of the new canal. The integuments on the right side were now dissected up, turned over a catheter, and brought in contact with the opposite groove. The detached portion of cicatrix bled little during the operation, and, before it could be applied to the groove, the edge had so livid an appearance as to create an apprehension that

it must perish. Two ligatures were employed to assist in retaining it in the desired position, and some straps of adhesive plaster and a bandage completed the dressings. The day following the operation, it was evident that some urine had escaped by the side of the catheter ; and on the third day, when it became necessary to remove the dressings, it was found that the portion of the flesh which had been denuded of skin had sloughed, but that a sufficient quantity had united above and below to form a canal open at one side, and large enough to include the whole catheter.

This result was quite as favourable as could, under all circumstances, have been expected ; and I was led to entertain sanguine expectations of ultimate success. The two surfaces, from whence the integuments had been removed, were now suffered to heal ; but as the cicatrix on the right side contracted, it drew the newly formed canal rather to that side, and tended to increase the opening into it. It was, consequently, determined not to attempt any thing farther until all contraction had ceased. So much, however, had been gained by this operation, that when the catheter was introduced, and the finger pressed on the left side, no urine escaped, and some could be made to pass through the penis without the aid of the catheter. My patient however, soon after this, became much disordered in his health, and had an attack of *lepra vulgaris*, to which he had for years been subject, on which account for some months nothing was attempted, except several times freely excoriating the edges of the canal, and thus endeavouring to unite them by keeping them in contact. In this we were constantly foiled by the astonishing rapidity with which the skinning process took place from

within outwards. This disposition to form new skin was so remarkable, as to excite the surprize of several gentlemen who witnessed it, and appeared to arise from the moist state in which the parts were constantly kept.*

In the summer of 1820, the man had recovered from his cutaneous affection, and his general health was so much improved, that he resolved to submit to a second operation. In this attempt I borrowed integuments from the opposite side to that I had taken them from in my first. A deep groove was made on the right side, the surface was denuded of its cutis to some extent, a considerable portion of integument was then detached from the left side, and, in order to obtain healthy skin, I encroached a little on the thigh, and laid bare the edge of the fascia lata. Instead of passing any ligature through the detached portion, the old quill suture was employed, which was passed from the two outer cut surfaces. A pad of adhesive plaster was interposed between the ligatures and the flap of skin, to diffuse the pressure more generally ; and my patient, being now quite an adept in passing the catheter, was directed to introduce it about three times in the twenty-four hours, instead of retaining it in the bladder,

* In corroboration of this, I have lately employed bread and water poultices to healthy sores, which have skinned over with greater rapidity than under any other application. Since making these experiments, I have learnt that Professor KERN, of Vienna, employs no other local remedy in the cure of ulcers, than water and a simple covering of linen. It is a curious fact, that in the sixteenth century, when the art of surgery was encumbered with useless nostrums and complicated instruments, and when the actual cautery and hot oils were the favourite remedies, that a similar simplicity of treatment should have been employed by MAISTRE DOUBLET, a contemporary of AMBROSE PAREY, of whom BRANTOME tells us,

“ Et toutes ses cures faisoit le dit DOUBLET par un simple linge blanc et belle eau simple de la fontaine ou des puits.”

which had permitted some of the urine to pass insensibly away, and had acted prejudicially in the former operation. By this attempt much more was gained, and about two-thirds of the canal were completed; still, however, there remained a small aperture at the upper part. We again attempted to close this by denuding the edges with escarotics and the lancet, but it skinned over too rapidly to allow of any union between the opposite surfaces. A third operation on a smaller scale was therefore necessary, which so nearly completed the cure as to leave only an orifice large enough to admit a bristle, which has subsequently closed, and, at the present time (March, 1821), he remains perfectly well, and is able to expel the contents of his bladder *pleno rivo*.

I may perhaps incur the charge of prolixity in the foregoing narrative, but I conceive it important to give a circumstantial account of the whole process, to mention all the difficulties I had to contend with, and the means which were employed to surmount them. Should I ever have occasion to repeat this operation, I should entertain sanguine hopes of succeeding at once, by avoiding some circumstances, and availing myself of others, a knowledge of which could only be gained by actual experiment.

The above case is, I believe, the first on record in which so extensive a portion of the whole canal of the urethra has been restored; and the mode of performing the operation has never, as far as I have been able to ascertain, been resorted to before. Mr. A. COOPER, in the second part of his Surgical Essays, which was published soon after my first operation on WHITAKER, has given an account of two very interesting cases, in which he succeeded in closing unnatural openings

in the urethra. In neither, however, of the cases which he has related, was the breach so extensive, nor did it occupy the whole canal. The second case, related in page 207, approaches nearer to WHITAKER'S than the first. In this instance the opening was anterior, but close to the scrotum ; and Mr. COOPER availed himself of this circumstance in effecting a cure ; a portion of the skin of the scrotum was partially detached, and turned over so as to cover the opening, the callous edges of which were previously pared away. The operation in this case differed materially from the one which I performed ; for in Mr. COOPER'S case, the raw surface was turned towards the urethra, whilst in mine the canal was wholly formed of a previously cicatrized smooth surface, which had undergone its utmost degree of contraction before it was employed to form the canal.

The fact I conceive is new, that, from a cicatrix of common integuments, a canal may be formed capable of conveying so acrid a fluid as urine, and of fulfilling *all* the functions of a healthy urethra, without being liable to any subsequent variation in its calibre. It is important, also, in throwing some light on the still disputed question of the muscularity of the urethra ; for since the patient quitted my care, he has more than once indulged in sexual intercourse ; and he assures me, that the jet of semen is as forcible as before the accident. When we consider that nearly, if not entirely, the whole of the ejaculator seminis must have sloughed away with the portion of the urethra which perished, and that an interval of above an inch of common integument at present exists between the two portions of the meatus urinarius, it is difficult to account for this phenomenon. It is probable, that

the semen is in the first instance projected into the urethra with some impetus, and it would there immediately receive additional impulse from the spasmodic action of the levator ani and other muscles in the neighbourhood of the urethra; but the vis a tergo must be nearly, if not entirely, lost in its passage through the portion of integument in the perineum. It must then depend for its final projection, either on the muscular fibres which have been described by Mr. BAUER as surrounding the mucous membrane of the urethra at its anterior part, or on the elastic property which has been assigned to it. If I might venture to offer an opinion on the subject, I should consider the present case rather in favour of the muscularity of the urethra, as the quantity of fluid secreted is hardly sufficient to distend the whole canal, a circumstance very essential to the reaction of an elastic tube. From the tortuous course of the muscular fibres, as described by Mr. BAUER in Sir E. HOME's paper, it seems probable that they would require to be elongated before they could act with force; and precisely such would be the effect of the injection of blood into the corpus spongiosum which takes place in coitu.

One more circumstance I may venture to allude to, as tending to support such an opinion, namely, the complete emission of the contained fluid which takes place, which requires a forcible and very sensible contraction of the whole canal, and cannot be accounted for on the supposed principle of elastic compression, unaided by muscular action.

On reflecting on the preceding case, it appears to me not less important in a practical than a physiological point of view; for the curative principles which were acted on, may

lay the foundation of an improved mode of treating some of the more lamentable cases of strictures with fistulous openings and diseased integuments in perineo. It is well known, that such cases occasionally baffle the skill of the ablest practitioners, and often terminate in premature death after years of continual suffering. When we consider that that part of the urethra situated opposite the perineum, is by much the most frequent seat of disease, and that it is often confined to this situation, it is probable that in such cases, if we could remove the diseased portion of the urethra, together with the thickened fistulous integument, much good might be effected; and perhaps even a permanent cure might be accomplished, by subsequently pursuing a somewhat analogous operation to the one performed on WHITAKER. Such a practice would, I conceive, be justifiable on two grounds. In the first place, the patient's state is nearly hopeless from all common plans of treatment, and should the operation not eventually succeed, he will not be rendered worse; for instead of making water through numerous fistulous apertures, and being subject to frequent depôts of urine and the formation of fresh abscesses, he would at once empty his bladder from the extremity of the membranous part of the urethra; and farther it may be urged, that no parts of vital importance would be endangered by the operation. It is true, that such a plan would be both painful and tedious, but I should still consider it worth the experiment, after in vain trying all the usual modes of relief. The case just related, and the success which attended Mr. COOPER, encourage us to hope that, in many cases which have hitherto been abandoned as incurable, much good may yet be effected by judicious treatment, and

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a right application of the known laws of the animal economy. Should future operations be equally successful, the borrowing from one part of the body to repair the loss of another, must be considered as one of the happiest modes of directing the reparative processes of nature; for the closing of large fistulous openings in the male and female urethra, must certainly be acknowledged as contributing more essentially to the happiness and comfort of an individual, than almost any other operation in surgery.

HENRY EARLE.

28, *George Street, Hanover Square,*

March 22, 1821.